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AUTHOR Murnane, Richard J.
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ABSTRACT

Contracts that base the compensation and job security of teachers on seniority may promote the goals of public education more effectively than performance-based contracts. Public school teaching is a very complex process requiring constant adaptation to changing students, situations, methods, and dynamics. Measurement of teacher performance under such conditions requires either constant, careful, and costly supervision or the use of student performance measures that cannot account for the full range of influences affecting teaching. Teachers are unlikely to be willing to stake their income and employment on proven effectiveness in such unpredictable situations. Adequately applied seniority rules, on the other hand, allow for the continuous development of good teaching practices over time without discouraging effort. The financial disadvantages and staffing problems accompanying application of seniority rules during recent periods of declining enrollment can be explained as the result of insufficient preparation on the part of both school district officials and teachers' union leaders conducting negotiations under unexpected pressures. (PGD)

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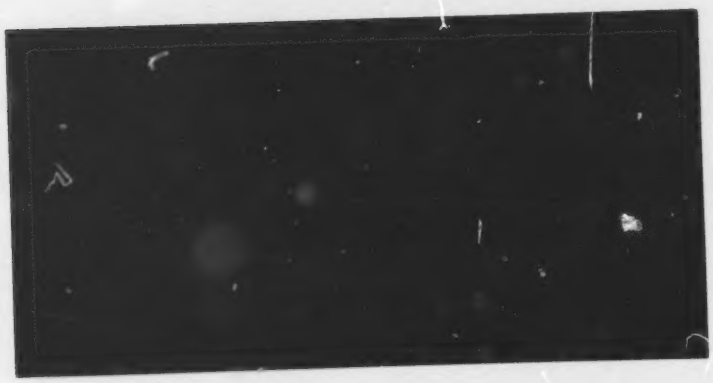

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SENIORITY RULES AND EDUCATIONAL PRODUCTIVITY: UNDERSTANDING THE CONSEQUENCES OF A MANDATE FOR EQUALITY

Richard J. Murnane*

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*Dr. Murnane is Professor, Department of Economics and Institution for Social and Policy Studies, Yale University.

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Abstract

This paper analyzes the impact on the performance of public education of seniority rules in teachers' contracts. Part I considers the relative merits of alternative types of employment contracts for teachers in light of recent economic literature on the determinants of efficient contracts and recent empirical work on the production process in education. The key point is that, given the technological characteristics of the education process, the mandate to provide an education to all children, and the lack of low-cost educational options available to low-income families, seniority-based employment contracts may be more effective in promoting public education than performance-based contracts.

Part II discusses the impact of seniority rules on the performance of public education during the last ten years, a period characterized by declining enrollments and growing power of teachers' unions. This part points out that seniority rules have created significant problems for school districts coping with declining enrollments. However, many of these problems stem from the lack of expertise on the part of school administrators and leaders of teachers' unions. The analysis suggests that as these agents have gained expertise, they have been able to find solutions to the problems of declining enrollments that mitigate the deleterious consequences of seniority rules, while retaining their positive contributions.

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INTRODUCTION

Many Americans are unhappy with the quality of public education in the United States. Costs continue to rise, even though the number of students has fallen in recent years, and indicators such as SAT scores and minimum competency test results show that many children are leaving the public schools without adequate preparation for college work and even without basic skills. Much of the criticism of the public schools in recent years has focused on personnel policies for teachers. One reason is that teachers' salaries and fringe benefits account for 70 to 80 percent of the current account budgets of most school districts. A second reason is that research evidence indicates that teachers are the school resource most important in determining how much children learn in school (Hanushek, 1979).

The purpose of this paper is to analyze the impact on the performance of public education of one critical aspect of personnel policy, namely, the role of seniority rules in determining the salaries and job security of teachers. The paper has two parts. Part I considers the relative merits of alternative types of employment contracts for teachers in light of recent economic literature on the determinants of efficient contracts and in light of recent empirical work on the nature of the production process in education. The key point of this part is that, given the technological characteristics of the education process, the mandate to provide an education to all children, and the lack of low cost educational options available to low income families, seniority-based employment contracts may be more effective in promoting education than contracts that base teachers' compensation and job security on assessments of their performance.

Part II of the essay discusses the impact of seniority rules on the

performance of public education during the last ten years, a period characterized by declining enrollments and growing power of teachers' unions. This part points out that seniority rules have created significant problems for school districts coping with declining enrollments. However, many of these problems stem not from the rules themselves but rather from a lack of expertise on the part of school district administrators and leaders of teachers' unions, the agents responsible for negotiating and administering interpretations of these rules. The analysis suggests that as these agents have gained expertise in consultation and negotiation, they have often been able to find solutions to the problems of declining enrollments that mitigate the deleterious consequences of the seniority rules, while retaining their positive contributions.

I. CONTRACT TYPES AND TEACHER RESPONSES

A. SENIORITY RULES FOR TEACHERS

In most school districts in this country, the salaries of public school teachers are determined by a unified salary schedule applying to all teachers in the district. In the schedules in use in most districts, the salary of an individual teacher is determined exclusively by the number of years the teacher has taught and by the highest degree the teacher has earned. Evaluations of teacher performance rarely have an impact on salaries.

In most districts, job security is also determined primarily by seniority. This has become an important issue in recent years as budget stringency and declining enrollments have reduced the demand for teachers and necessitated transfers and layoffs of large numbers of teachers. In most districts the rules governing transfers and layoffs contain the

following steps:

1. When declining enrollments necessitate a reduction in the teaching staff of a school, the teacher in that school with the least seniority loses his or her position.
2. This teacher may then transfer to any vacant position in the school system for which he or she is qualified.
3. If no vacancy exists, this teacher may displace the teacher in that particular job category who has the least seniority in the system.

The common thread running through the rules is the primary role of teacher seniority.

A criticism often made of contracts that place heavy reliance on seniority rules is that they provide teachers with perverse incentives, and as a result, make the system less efficient. The key points in the argument are that ineffective teachers are given no clearcut signals that their performance must be improved; effective teachers are given no special rewards. As a result, poor teachers remain in the profession without improving their performance, while talented teachers, discouraged by the lack of rewards for effective teaching and attracted to professions in which salaries are related to productivity, leave the profession.

One implication of this criticism is that the delivery of educational services would be more efficient if performance were the primary determinant of the compensation and job security of teachers. This implication is valid if it is possible with reasonable monitoring costs to assess the performance of individual teachers accurately. Recent contributions to economic theory have clarified the circumstances under which this condition is fulfilled. These arguments are presented in the next section.

B. EFFICIENT CONTRACTS

The economic literature on employment contracts addresses the following question: What factors influence the efficiency of different types of employment contracts? This section draws from this literature to describe the factors influencing the efficiency of three types of employment contracts. These descriptions will prove useful in analyzing employment contracts for public school teachers.

Consider first employment contracts in which the compensation and job security of the individual worker are based on a measure of the worker's output. The simplest of such contracts is the piece rate contract. Such a contract is efficient if the contribution of the individual worker to the firm can be measured accurately at relatively low cost. Commercial laundries' contracts with workers who iron shirts provide an example. A single worker does the entire ironing of any given shirt so the problem of joint products is not present. Counting the number of shirts ironed is inexpensive, and the problem of poor quality is controlled by customer complaints.

A second type of employment contract specifies that compensation and job security depend on supervisors' assessments of observed actions of individual workers. This type of contract is common in situations in which employees work in groups and the value added of individual workers cannot be determined, but their contribution can be assessed by their effort level and by the extent to which they adhere to actions known to be related to productivity. Alchian and Demsetz (1972) provide the example of workers employed to unload a truck. Since several laborers work as a team unloading a truck, the output of an individual worker

cannot be measured. However, since the actions required to empty the truck are well understood and easily observable, the performance of individual workers can be assessed by observing their actions. These assessments can then be used to dismiss incompetent workers and to reward exceptionally productive workers.

The requirements for this type of contract to be efficient are that the relationships between worker actions and desired output be clear-cut and that the costs of monitoring worker actions be low relative to the productivity gains associated with an incentive system that bases compensation and job security on assessments of performance.

A third type of employment contract specifies that compensation and job security are determined by internal labor market rules. While the precise details of these rules vary, typically seniority plays a dominant role. As Williamson (1975) has explained, this type of contract is efficient in work situations characterized by the following two conditions:

1. As a result of on-the-job experience, individual workers acquire specialized knowledge, the use of which has a significant impact on the performance of the firm.
2. It is very costly for supervisors to assess accurately the performance of individual workers, including the use of their specialized knowledge.

In firms characterized by these two conditions, workers have the potential to engage in opportunistic behavior that enhances observers' estimates of their productivity, but in fact does not contribute to the firms' goals. In these situations, it is important to minimize the incentives for workers to engage in such behavior. A contractual system in which

seniority plays a central role in determining the compensation and job security of workers contributes to this objective.

An oft cited example (e.g., Thurow, 1976) of a situation in which there is potential for opportunistic behavior is the operation of machine tools. Experienced workers acquire knowledge of the idiosyncracies of particular machine tools. Efficient operation dictates that new workers acquire this knowledge as rapidly as possible. However, since the information is not codified, it can only be transmitted to new workers quickly if experienced workers provide informal on-the-job training. If compensation and job security depend on assessments of the performance of individual workers, experienced workers have the incentive to conceal such knowledge.

Thus, the combination of specialized knowledge that can be used strategically and high transaction costs associated with monitoring the use of this knowledge creates a situation in which contracts that base compensation and job security on seniority may elicit behavior more consonant with the firm's goals than contracts that reward assessed performance.

Employment contracts influence the efficiency of firms not only by affecting the behavior of workers while on the job, but also by affecting the mobility of workers. Firms offering employment contracts that reward observed performance will attract productive workers if the following two conditions characterize the production activity:

1. The contribution of individual workers to the firm can be assessed accurately by supervisors. (In other words, there is no potential for undetected opportunistic behavior.)

2. The relationship between the worker's actions and the worker's performance is stable.

When either of these conditions is absent, employment contracts that base compensation on assessed performance may not attract the most productive workers.

Consider the first condition. In situations in which opportunistic behavior can go undetected, performanced-based contracts create conflict between behavior that leads to high monetary compensation and behavior that promotes productivity. If the job satisfaction of productive workers depends on a sense of efficacy in doing a job well (March and Simon, 1957), such workers may react to this conflict by leaving the firm.

The second condition concerns the degree of stability in the relationship between the actions of the worker and assessed output. If the relationship is unstable (the same worker actions result in different output levels at different points in time), risk averse workers will accept performance-based contracts only if the reward structure includes risk premiums to compensate workers for assuming the risk of factors beyond their control (Hirshleifer and Riley, 1979). Firms that use performance-based contracts without risk premiums will find it difficult to attract productive workers. If the instability is very great, and consequently large risk premiums would be required, firms may find it efficient to pay workers on the basis of seniority even though such contracts do not provide incentives for high effort levels. These arguments are developed more fully later in the paper when contracts for teachers are analyzed.

In summary, the efficiency of alternative contracting forms is

determined by the nature of the production technology and the level of transaction costs associated with monitoring performance. In situations in which there is a stable relationship between worker actions and assessed performance, and the actions of workers can be monitored at low cost, contracts that base job security and compensation on supervisors' assessments of worker competence will be efficient (Alchian and Demsetz's example of truck loading). In situations in which the output of an individual worker can be observed and evaluated at relatively low cost, contracts that reward performance will be efficient (ironing shirts). In situations in which workers acquire information critical to the productivity of the organization as they work at their jobs, and the use of this information cannot be monitored without high costs, employment contracts in which job security and compensation are heavily influenced by seniority may be relatively efficient (operating machine tools that have idiosyncratic bugs).

C. CHARACTERIZING THE PRODUCTION PROCESS IN EDUCATION

This section describes attributes of public education that influence the efficiency of alternative contracting forms. The first of these attributes of public schooling is so peculiar and subtle in its effects that its significance for economic issues has not been fully recognized. It demands special attention, not only for the limited problems discussed in this essay, but in all analyses of the economics of education. The other attributes (numbered 2-5) are characteristics of the production process determining the achievement of children. These characteristics are important in applying the analysis of the previous section to the issue of efficient contracts for public school teachers.

1. Student Diversity and the Equal Access Mandate

A central fact about the public schools is that they have a mandate to educate every child who comes to the school door. This mandate is reflected in a variety of public documents, including court decisions such as Brown v. Board of Education of Topeka (1954)[1] and Lau v. Nichols (1974),[2] Congressional legislation such as Title I of the Elementary and Secondary Education Act of 1965 and the Education for All Handicapped Children Act of 1975, and the provisions in many state constitutions guaranteeing that all children will be provided with a "thorough and efficient" education.[3] While these documents do not specify exactly what is to be equalized (a point discussed later in the paper), they do imply that as a minimum every child should have equal access to the resources available in public schools, including the time and attention of teachers. I call this the equal access mandate.

The students who go to public schools, and to whom the equal access mandate applies, vary enormously in backgrounds, attitudes, skills, and handicaps. As a result of these differences, students also vary in their receptivity to school and in what they learn in school. The responses of public school teachers to this diversity and to the equal access mandate provide the focus of much of the analysis that follows.

2. Effective Teaching

There is clear evidence that some teachers are more effective than other teachers in helping children to acquire cognitive skills (Hanushek, 1979). However, very little is known about the characteristics of effective teaching. Despite a great deal of research, there is very little evidence of consistent relationships between the use of particular

instructional techniques and student learning (Averch et al., 1972; Pflaum et al., 1980; Rosenshine, 1976).

A compelling reason for the disappointing research results is that the effectiveness of particular instructional techniques depends critically on the characteristics of the children in the class, on the skills and personality of the teacher, and on the nature of the interaction of students and teacher. The critical characteristics of students and teachers that influence the effectiveness of particular instructional techniques may be very subtle, and consequently cannot be identified by researchers. Teachers find effective techniques through a process of trial and error and adaptation. In other words, effective teaching is characterized by an efficient search process, rather than by careful application of well specified techniques.

3. Teacher Allocation of Time

The achievement gains that children make during a school year depend not only on the effectiveness of the teacher in using instructional time, but also on the allocation of instructional time to different children (Brown and Saks, 1975; Monk, 1979; Thomas, 1977). Among the important decisions teachers make is how to divide children into instructional groups and how much time to spend with individual children, with particular groups of children, and with the class as a whole. Recent evidence indicates that children's learning is sensitive to the amount of instruction the child receives, and that the gains from individualized instruction and instruction in groups of different sizes differ (Brown and Saks, 1979; Kiesling, 1979). Thus, the impact of the teacher on children's learning depends not only on the skill of the teacher, but

also on the decisions the teacher makes in allocating time to different children.

4. Teacher Knowledge of Student Capabilities

As teachers search for instructional strategies and allocations of classroom time that will be effective for their students, they acquire information about the responses of individual children to instructional time. For example, they learn which students respond quickly to additional attention and which students respond only very slowly to large allocations of time and other resources. They also learn over a period of years which families are supportive of their teaching and which families can be called upon to respond to problems regarding their children. This information is acquired by on-the-job experience, interacting with children and their families, and much of it is not accessible to supervisors.

5. Peer Effects

The impact of school on a child's learning is determined not only by the actions of the classroom teacher, but also by the attributes and actions of the other children in the class. The precise nature of these peer effects has proved almost as elusive to researchers as have the determinants of effective teaching (Rosenbaum, 1980). However, the key point for this paper is not the precise nature of the peer effects, but rather that the amount of progress students make during a school year depends not only on the actions of the classroom teacher but also on peer group influences which are to a large extent beyond the control of the teacher.

D. EMPLOYMENT CONTRACTS FOR PUBLIC SCHOOL TEACHERS

This section considers how the five factors characterizing public education influence the responses of public school teachers to different types of employment contracts. Three types of contracts are considered:

1. contracts in which the job security and compensation of teachers are determined by supervisors' evaluations of teacher actions;
2. contracts in which the job security and compensation of teachers are determined by evaluations of the academic progress students make;
3. contracts in which the job security and compensation of teachers are determined by seniority.

These contract types correspond to the three types of employment contracts described earlier in the paper; however, they are discussed in a different order.

1. Contracts That Base Teachers' Salaries and Job Security on Supervisors' Evaluations of Teachers' Actions

This type of contract is not efficient for employing teachers because, as discussed in the previous section, there is no well defined relationship between particular teaching techniques and student learning. Effective teaching requires experimentation, and observation of an unsuccessful experiment does not provide evidence of ineffective teaching. Moreoever, the costs of monitoring are high, both because extensive observation is required to gain a sense of what a teacher is attempting, and also because the monitoring process itself may disrupt the interactions among teacher and students that result in learning.

It is important at this point to note that evaluations by able

supervisors will reveal the truly incompetent teacher who has not acquired any of the skills necessary to help children to learn and who does not respond to help in acquiring these skills.[4/] It is clear that efficient operation of the public schools requires the dismissal of such teachers. However, the right to dismiss such teachers is not an issue of contract form. Even collectively bargained contracts with heavy reliance on seniority provide for the dismissal of incompetent teachers after this incompetence is documented through due process. Providing incentives for supervisors to document incompetence and to request dismissal is a serious concern. However, this concern is not an issue of contract form.

2. Contracts That Base Teachers' Salaries and Job Security on Estimates of Student Learning

Employment contracts that base the compensation of workers on assessed output provide incentives for workers to behave in a manner that produces the highest assessment. If the behavioral response consists of greater effort, the response is desirable. However, evaluating teachers on the basis of student learning provides incentives for other responses as well. Such responses may jeopardize the public school commitment to equality and may also result in less efficient provision of educational services.

The potential for dysfunctional responses stems from the nature of the teaching task, which is to help all of the students in a class to learn. Evaluating teachers on the basis of student performance requires the aggregation of the learning gains of the children in each class; and aggregation requires that weights be assigned to the progress of each child. These weights matter because in any given class some children

make much more progress during a school year than other children do. As a result, the performance of a teacher relative to colleagues will be sensitive to the weights attached to the achievement of individual children and to the assignment of children to teachers.

Thus, the use of performance measures to determine salary and job security requires the assignment of cardinal weights to the learning gains of different children. There is no social process that provides such a system of weights. Public pronouncements clearly indicate a concern with the treatment different children receive in the public schools. However, they do not provide clear information about what is to be equalized, and consequently they do not reveal the weights that should be assigned to the achievement of individual children.[5/] Given this situation, any set of weights used in evaluating teachers must be considered arbitrary, and consequently, it is important to consider the impact of these weights on the distribution of student achievement.

We now turn to a consideration of the responses from teachers that performance based employment contracts may elicit. The first response is lobbying for students who respond well to school instruction. Teachers who have been at a school for a number of years are in the best position to do this since their experiences in previous years provide them with information about the skills and attitudes of children in particular families. If senior teachers recruit the students that learn the most in school, then other teachers are left with children who are more difficult to teach. These teachers would be placed at a significant disadvantage in comparative evaluations, and consequently the integrity of the evaluation process is undermined.

It is possible to overcome this response by randomly assigning students to teachers. However, this eliminates any efficiency gains that result from matching children with particular needs to teachers with particular skills.

A second response that is more difficult to prevent is that teachers may allocate time within the classroom disproportionately to those students for whom additional instructional time results in the greatest increase in weighted achievement. Attempting to constrain teachers' allocation of time involves extremely high monitoring costs. Moreover, the trial and error process used to find effective teaching methods requires extensive experimentation with time use.[6/]

Would teachers respond to the evaluation system by altering the amount of instruction they give to different children? As discussed below, the limited information that is available suggests that this may occur. However, it is possible that teachers may not respond at all to the imposition of performance-based contracts. But, if there is no response, nothing has been gained. It seems implausible that teachers would respond only by working harder and not by strategically using their knowledge of individual students' capabilities to allocate instructional time so as to maximize their performance rating.

Consequently, one must take seriously the possibility that evaluating teachers on the basis of the academic performance of their students would induce teachers to devote large amounts of time to some children in the class and very small amounts of time to other children. Which children would be neglected? This would depend on the weights used in the evaluation system and on the distribution of learning abilities of the

children in the class. If the evaluation system weighted the achievement gains of all children equally and if all children had the same response to instructional time, then a system of equal weights would result in equal time allocation. The equal weights assumption is plausible; in fact, it is implicit in the most commonly used measure of performance, the average achievement gain of the children in the class. However, the assumption of a common response to instructional time is not plausible. There is ample evidence that children learn at different rates. Moreover, it is children who come to school with disadvantages such as broken homes and low family income who most commonly respond slowly to school instruction. As a result an evaluation system based on equal weights provides teachers with the incentive to allocate small amounts of time to children who are already disadvantaged as a result of environmental circumstances external to the school. Thus, a system of rewarding teachers on the basis of the academic performance of their students may undermine the elusive but very real social mandate to the public schools to provide an adequate education to all children. This is particularly troubling because the children most likely to be neglected tend to live in families that find it extremely costly to respond to neglect either by voicing dissatisfaction effectively or by leaving the public schools.

It is probable that many teachers will not respond to performance-based contracts by neglecting disadvantaged children. Many teachers enter the profession with a strong commitment to help disadvantaged children even though the response to such help is often small and slow in coming. Changes in the reward structure may not induce such teachers to change their teaching behavior. However, the experience of conflict between

behavior that leads to high evaluations and behavior that reflects commitment to troubled children is highly frustrating and may lead such teachers to leave the profession. Resignations of teachers with particular concern for disadvantaged children would seriously impair the ability of the public schools to help such children.

Performance-based contracts could also increase the cost of employing teachers of a given level of effectiveness. The reason is that the achievement gains of the children in any given class depend only in part on the skills and effort level of the teacher. They also depend on factors beyond the teacher's control such as home and peer group influences. As a result even very talented teachers have years in which their students make much less progress than in other years (Averch et al., 1972, pp. 57-58; Begle and Geeslin, 1972, p. 143; Jackson, 1968, p. 125). The external influences are extremely subtle and it is very costly if not impossible for supervisors to assess accurately the extent to which the achievement gains of students are determined by peer and home factors. If teacher salaries are tightly tied to the achievement gains of students, then salaries of teachers would vary from year to year. Assuming teachers are risk averse, they would require significant salary premiums to compensate for bearing the risk of variation in student performance beyond their control.

I have suggested that as a result of particular characteristics of the production process in education, performance-based contracts may induce responses that jeopardize the equality of education provided to children in public schools and may reduce the effectiveness of the educational system. Is there evidence to support these arguments? The

evidence is sparse. However, the limited information that is available suggests that the concerns expressed above are important ones.

The first piece of evidence comes from the federally funded performance contracting experiments in the early 1970's. Performance contracting in education is an attempt to foster productivity by offering financial incentives for success in helping children to acquire specific skills. In the experiments, private firms signed contracts under which they received a fixed payment for each child whose reading skills during a school year increased by at least a grade level as measured on a standardized test. Evaluations of the experiments revealed that at one site firms responded to the incentives provided in the contract by allocating more time to children of average ability than to high ability or low ability children. High achievers were neglected because they would increase their reading skill by one grade level without a significant amount of in-school instruction. Low achievers were neglected because they were unlikely to achieve the grade level increase in skills even with a great deal of instruction (Gramlich and Koshel, 1975, pp. 55-56). The experiment ended before there was time to learn how parents of neglected children would respond or whether alteration of the compensation algorithm was politically possible and whether it would have elicited a different allocation of resources. However, the experiments did show that firms willing to supply educational services on a profit making basis can be expected to respond to the incentives provided in the contractual agreements.

The second piece of evidence comes from a study by Philip Jackson (1968) in which he interviewed fifty teachers considered by their

supervisors to be extremely effective. Among the issues Jackson discussed with these teachers was their attitude toward performance-based contracts (merit pay). These teachers, who presumably would gain additional income under such a system, indicated strong resistance. Several teachers indicated that they would not work under such a contractual system (p. 132). The reasons included the statement that performance depended greatly on factors beyond their control such as the mix of children in the class. Moreover, such a system would inhibit teamwork and creative responses to the needs of individual children.[7] Many teachers indicated that a system of compensation that encouraged opportunistic behavior reduced their job satisfaction even if it did result in additional income.[8]

The third piece of evidence concerns the results of performance-based layoffs. Several Massachusetts school districts responded to declining school enrollments by laying off teachers on the basis of evaluations of their performance. Interviews with teachers and supervisors in these districts (Johnson, 1980) indicated that such a system caused such a debilitating reduction in morale and productivity that the districts discontinued the policy after only a short time.

3. Contracts That Base Teachers' Salaries and Job Security on Seniority

Contracts that base the salaries and job security of teachers on seniority provide no financial incentives for outstanding performance. For this reason such contracts are often criticized by analysts concerned with productivity. The emphasis in this essay is that in evaluating seniority rules it is necessary to compare the responses they evoke with the responses that alternative incentive structures evoke. Given the

characteristics of public education, including the commitment to teach all children, the nature of the teaching task, and the lack of low cost alternatives to the neighborhood school for parents of disadvantaged children, the responses elicited by seniority rules may be less detrimental to the performance of public education than the responses elicited by contracts that reward assessed productivity.[9/]

In light of the somewhat counterintuitive nature of this argument, it may be useful to state once again the reasons performance-based contracts are not effective in promoting the goals of public education. As public education is currently organized, disadvantaged children are heavily dependent on the professional dedication of teachers for the extensive help they need. There is clearly wide variation in the extent to which teachers provide such help under the current incentive system. However, a reward system that provides incentives to maximize the average achievement of students may lead many teachers to devote less time to disadvantaged children and may induce teachers particularly concerned with disadvantaged children to leave the public schools.

Given the arguments suggested above, it is instructive to ask whether seniority rules play less of a role in the personnel policies of private schools, and if so, why this is the case. There are two parts to the answer. First, while there is enormous variation in the personnel policies of private schools, in most schools seniority does play a role in determining compensation. For example, many private schools use a salary schedule that specifies a lower and an upper bound for all teachers with a given level of seniority. Both the upper and lower bounds increase with seniority. It is true, however, that there is often more flexibility in

the salary schedules of teachers in private schools than is the case in public schools. This leads to the second part of the answer.

Two important ways in which private schools differ from public schools are that private schools select their students and parents select the schools for their children. Selection by the school reduces the variation in the abilities and attitudes of the children any given teacher is asked to work with. Selection by the parents means that parents who feel their child is neglected will withdraw the child. These selection procedures allow supervisors in private schools to apply the evaluation standard of whether teachers are successful in teaching a relatively homogeneous group of children who want to be at that school. This is not an appropriate standard for evaluating public school teachers.

E. INCENTIVES FOR EFFECTIVE TEACHING WITHIN A SENIORITY-BASED SYSTEM

At this point in the analysis, a critic of seniority rules might make the following argument: While you have shown that performance-based contracts for teachers elicit dysfunctional responses, you have not demonstrated that incentives for effective teaching can be provided within the context of seniority-based employment contracts. Without such incentives, seniority-based contracts may not be superior to contracts based on performance assessments.

A comprehensive response to this argument is beyond the scope of this paper and, in fact, is beyond the scope of available evidence. This is the reason that this essay, while it identifies and illuminates many problems with alternatives to seniority-based contracts, is not intended to be a definitive defense of seniority-based contracts. With this caveat in mind, it is appropriate to respond to the hypothetical critic of

seniority rules with the following two points.

First, within the general context of a seniority-based system, there are ways to attract, retain, and motivate effective teachers. For example, some states provide small grants on a competitive basis to teachers interested in pursuing special teaching projects. A recent study (McDonnell and McLaughlin, 1980) reports that these grants have been very effective in motivating teachers.[10/] A second example is the creation of positions of "master teachers", to which exceptional teachers can be promoted.[11/]

The second point is that success in developing and implementing methods to motivate effective teaching depend critically on the quality of relations between teachers and school district officials. The next part of the paper focuses on these relations during the last ten years.

II. SENIORITY RULES IN A REGIME OF COLLECTIVE BARGAINING AND DECLINING DEMAND FOR TEACHERS

In the last ten years, public education in the United States has been enormously influenced by two logically unconnected, but coincident phenomena. The first is the decline in student enrollments. The second is collective bargaining and the increased influence of teachers' unions. These developments have had a radical impact on relations between teachers and administrators in general, and in particular, on the interpretation and administration of seniority rules. This part of the paper focuses on the role of seniority rules in influencing educational productivity in a regime characterized by collective bargaining and a declining demand for teachers, precipitated by student enrollment declines. I begin with a brief description of the magnitude of the enrollment declines.

A. DECLINING ENROLLMENTS

Seniority rules governing the job security of teachers have impinged on the allocation of teaching resources in recent years, primarily as a result of the unprecedented decline in student enrollments in the nation's public schools. From a peak of 32.6 million in 1970, the number of children attending public elementary schools in the United States declined to 29.4 million by 1977. That this trend will continue for some time is suggested by the fact that the number of children in the first grade of public schools in the United States has decreased from 3.8 million in 1970 to 3.3 million in 1977 (Digest of Education Statistics, 1979).

The effects of enrollment declines on the demand for teachers have been particularly great because of the fiscal crises that hit many cities during the 1970's. As a result of these crises, many school districts could not cushion the impact of declining enrollments by reducing class size markedly. Instead administrators were told to contribute to the budget cutting effort by reallocating teachers and by reducing the number of teachers employed by the district.

B. THE IMPACT OF SENIORITY RULES ON THE PROCESS OF ADJUSTMENT TO DECLINING STUDENT ENROLLMENTS

Seniority rules place severe constraints on the process by which school districts adjust to declining student enrollments. The reason is that the rules determine to a large extent the pattern of transfers and layoffs that will result from a reduction in the size of the teaching force (Murnane, forthcoming, 1981). For example, when declining enrollments dictate the reduction in the number of teachers employed in a particular school, seniority rules determine which teacher must leave the

school, and what the options of that teacher are. Most contracts state that if an opening for which the displaced teacher is qualified is not available in another school in the district, the teacher may displace ("bump") a teacher with less seniority from his or her position.

The operation of these rules threatens the efficiency of school district operations for several reasons. First, staffing patterns are often disrupted, resulting in the breakup of teams of teachers that have learned to work together effectively over a number of years. Second, the operation of these rules results in the layoff of many young teachers. Many administrators feel that this is particularly costly to the school system because as a result of the current excess supply of teachers, administrators have been able to upgrade the quality of their teaching staff by being highly selective in choosing among the many applicants for positions. In addition, young teachers tend to be more responsive to innovations and therefore the aging of the teaching population may make it particularly difficult to develop and implement new ideas (Berman and McLaughlin, 1977, p. 136).

A third problem concerns the budgetary impact of layoffs based on seniority. Since salaries are determined by seniority in most districts, layoffs of the most junior teachers provide the least relief to financially strained school districts. One final problem is that seniority-based transfers and layoffs often jeopardize attempts to racially integrate the teaching staffs of individual schools and school districts.

These problems are severe. The constraints on the adjustment process imposed by seniority rules have frustrated administrators

responsible for school district operations. However, alternative methods of allocating teachers, based on assessments of their performance, also elicit responses that tend to jeopardize the efficiency and equity of school district operations. Thus, the challenge facing administrators and representatives of teachers is to find methods of adjustment to declining enrollments that mitigate the adjustment costs while retaining the advantages of seniority rules described in Part I.

C. FINDING SOLUTIONS

How effective have school district administrators and leaders of teachers' unions been in negotiating, implementing and administering solutions to the personnel problems posed by declining enrollments? There is a great deal of variation across districts in the nature of the responses. However, in many districts, the adjustment process has been characterized by conflict that reduced the effectiveness of public education.

Why has it been so difficult for administrators and representatives of teachers' unions to work out satisfactory responses to the personnel problems created by declining enrollments? One reason is that the adjustment process is more constrained than is the case in other industries. Many private sector firms faced with a decline in demand for their products can alter the size of their product inventories to buffer the impact of demand changes on employment. They can also conduct marketing campaigns to increase the demand for their products. Neither of these responses is available to school districts.

A second, more important reason for the debilitating conflict that has characterized the adjustment process in many districts is the lack of

expertise on the part of participants. Most school administrators were trained during a period when the critical problem facing public schools was rapid enrollment increases. Few administrators had experience with declining enrollments. Consequently, little was known about the responses that particular adjustments would elicit.

Another reason that district level administrators were unprepared for the 1970's was that prior to collective bargaining, superintendents often acted as advocates for teachers, making the case to city councils that high quality education required higher teacher salaries. Many administrators felt uncomfortable with the change from advocate for teachers to bargaining opponent. Consultation and negotiation with representatives of teachers' unions were not part of the decisionmaking process as they had learned it.[12/] Consequently, their reactions to pressure from teachers' unions sometimes included unilateral actions that violated the spirit, if not the letter, of teachers' contracts.

A third difficulty was lack of preparation time. In the first years of collective bargaining, preparing for contract negotiations with teachers' unions was only one of many duties of district administrators, a duty often added on top of other responsibilities. Few administrators had adequate time to prepare for collective bargaining.

Many of the reasons that administrators lacked expertise in finding solutions to the problems of declining enrollments in a regime in which power is shared with teachers' organizations also pertain to teachers' representatives. In the first years of collective bargaining, many union leaders retained all or part of their teaching duties, and consequently had little time to prepare for collective bargaining. Also, few union

leaders had extensive experience in collective bargaining. Prior to collective bargaining teachers relied primarily on persuasion to achieve their goals. The basic strategy was to make a persuasive case for improved salaries and working conditions. Teachers expected that if the case was a compelling one, the school district would honor their request. Collective bargaining works quite differently. Although persuasion still plays a role, exchange is the central characteristic of decisionmaking under a system of collective bargaining. In the first years of collective bargaining many union representatives, lacking expertise in exchange relationships, made a persuasive statement of their demands and then adopted a take it or leave it strategy rather than the give and take strategy that characterizes successful collective bargaining.-

As a result of the lack of expertise of administrators and union leaders, adjustments to declining enrollments in the early 1970's were often characterized by a lack of trust, by the absence of meaningful consultation or negotiation, and ultimately by work stoppages, court suits and other manifestations of conflict that reduced the ability of the schools to educate children.

In many communities, the expertise of school district administrators and union leaders has increased in recent years. Administrators have learned methods of allocating resources that do not violate the letter or spirit of teachers' contracts. Union leaders have become more aware that the long-run welfare of public school teachers depends not only on new benefits, but also on positive public attitudes towards public education. Both parties have learned the importance of consultation and negotiation in coping with the large number of unpredicted personnel problems that

continually arise in public education and in interpreting provisions of teachers' contracts that are often ambiguous in the face of unpredicted personnel problems.[13/]

A significant example of this increased expertise concerns the methods used to lay off teachers. Most contracts state that teachers who will be laid off at the end of the school year must be notified by a particular date, such as April 1. The logic of this rule is that early notification provides time for teachers who will be laid off to search for alternative employment. The problem this rule poses for school districts is that accurate projections of student enrollments and teacher resignations are not available by the notification date. In the past many districts responded to this dilemma by sending layoff notices to a much larger number of teachers than the district ultimately expected to lay off. Teachers' unions argued that this constituted an unfair labor practice in that it meant that teachers were forced to bear the risk of uncertain enrollment and resignation patterns. In some cases the district action precipitated work stoppages and court action on the part of teachers. Another response, unpredicted by school administrators, is that many teachers did find alternative employment, forcing the district to incur the costs of screening new applicants at the end of the summer to fill vacant positions.

In recent years district administrators and union leaders in some communities have been able to negotiate changes in the notification rule that provide benefits to both the school system and teachers. A typical negotiated change is that teachers who may be laid off may voluntarily accept a delay in notification to August 1, in return for an extension of

health benefits to the end of the calendar year if layoff proves ultimately necessary. This negotiated settlement provides teachers with an important fringe benefit and allows the district additional time to acquire information about the demand for teachers before making layoff decisions. It should be noted that in addition to the benefits to teachers and to administrative flexibility, this solution may contribute to productivity by permitting the retention of teachers who have experience in the school system.

Early retirement programs are another example of a creative solution to the personnel problems caused by declining enrollments. These programs provide financial incentives for older, high salaried teachers to retire, thereby reducing the need for involuntary transfers and layoffs of less senior, lower salaried teachers. Like the change in notification rules, successful implementation of early retirement programs requires expertise on the part of labor and management and a general atmosphere of trust.[14/] It is difficult to believe that successful implementation of early retirement programs or changes in notification rules would have been attained in the atmosphere of confrontation that characterized labor management relations in many communities in the early 1970's.

This section of the essay has pointed out ways that seniority rules increase the difficulties school district managers face in adjusting to declining enrollments. In assessing the overall impact of seniority rules on the quality of education provided to children, these difficulties must be weighed against the advantages of seniority rules described in Part I. The key point of this part of the essay is that the ultimate impact of seniority rules on the ability of the public schools to provide

high quality education to all children depends critically on the expertise of district managers and union leaders responsible for negotiating, interpreting and administering these rules.

In situations in which negotiations are carried out by expert bargainers in an atmosphere not charged with confrontation and recrimination, it appears possible to find solutions to the problems posed by declining enrollments that retain the seniority rights of teachers and also retain a considerable amount of flexibility in allocating teaching resources.

SUMMARY

Seniority rules in teachers' contracts, vigorously defended by union leaders and criticized by some officials and analysts, have been the subject of a good deal of misunderstanding. This paper has attempted to clarify the significance of seniority rules by placing them in the context of the production process of schooling. This analysis suggests that seniority rules in education are not intrinsically dysfunctional; like all conceivable institutional rules they sometimes cause problems, but these problems should be viewed in the broader context of the rules' contribution, or lack of contribution, to the performance of the sector.

The first part of the essay shows that the relative efficiency of alternative contract forms depends on

1. the definition of performance,
2. the technology of the education process,
3. the nature of the choices available to parents unhappy with the education their child is receiving.

Given the equal access mandate, the technical characteristics of the education process, and the lack of options available to low income parents, contracts that base the compensation and job security of teachers on seniority may promote the goals of public education more effectively than performance-based contracts.

The second part of this essay explains that the effects of seniority rules on the difficult process of adjustment to declining enrollments are determined by the expertise of the agents who interpret and administer those rules. Neither school district officials nor teachers' union leaders were fully prepared for the challenges posed simultaneously by declining enrollments and the introduction of collective bargaining in the 1970's. This lack of preparation is a more compelling explanation for the problems that declining enrollments created for public education in the 1970's than the type of contracts used to employ teachers.

FOOTNOTES

1. Brown v. Board of Education of Topeka, 347 U.S. 483 (1954).

2. Lau v. Nichols, 414 U.S. 563 (1974).

3. This language appears in the New Jersey state constitution and played a significant role in the New Jersey school finance case, Robinson v. Cahill, 118 N.H. Super. 223 (Law Division) 1972.

4. There is limited evidence that supervisors can identify incompetent teachers. Two studies (Armor et al., 1976; Murnane, 1975) report that principals' evaluations of teachers do reflect teaching performance as measured by student test score gains. One might argue that the results of these studies weaken the argument against basing teachers' salaries on supervisors' evaluations. However, it is important to recognize that in the districts that supplied the data for these studies, evaluations did not influence the compensation or job security of teachers. Consequently, teachers had no incentive to engage in opportunistic behavior that would have reduced the quality of education provided to children and would have reduced the ability of supervisors to assess the contributions of individual teachers. One other relevant point is that in the Murnane study, the evaluations of principals were significantly related to the performance of white teachers, but were not significantly related to the performance of black teachers.

5. At first glance, it appears that the economics literature on principal-agent relationships should provide insights on the question of efficient contracts for teachers. However, the formal models are not helpful because they posit that the principal has a clear objective function. The lack of consensus on the weights to be attached to the

learning gains of individual children is evidence that the public schools do not have a clear objective function they seek to maximize.

6. Another dysfunctional response is focusing instruction on test content. This may result in high test scores. However, if such instruction diminishes students' interest in learning for its own sake, it may reduce students' ability and desire to learn on their own in future years.

Another, much discussed response is cheating on tests. The problem of cheating is not emphasized because it is only one of several dysfunctional responses. If it were the only dysfunctional response, a tighter control system might solve the problem. A key point of this paper is that controls cannot cope effectively with many of the dysfunctional responses that a merit pay system might engender, such as neglect of particular children.

7. Seymour Sarason has stressed the importance of interaction with colleagues in helping teachers to develop productive responses to the problems they face. His recent work (1977) has emphasized the role of networks in facilitating such interaction. Performance-based contracts may hinder the development of networks of support by making teachers reluctant to share ideas and materials, and more importantly, by making them reluctant to admit problems they are experiencing. In this perspective, one might argue that contracts that emphasize seniority may be relatively efficient because they provide a necessary (although surely not sufficient) condition for creative interaction among teachers. Such creative interaction may lead to productivity increases that more than offset losses in productivity caused by the lack of tie between

productivity and salary in contracts based on seniority.

8. The Jackson evidence reflects the responses of teachers who chose to work in a seniority-based reward system. One could argue that the responses of these teachers do not provide compelling evidence about the consequences of performance-based employment contracts. The reason is that such a system might attract teachers with very different preferences.

9. The lack of low cost alternatives to the neighborhood school has been discussed as one of the reasons that performance-based contracts for public school teachers may reduce the quality of education provided to disadvantaged children. The reader may infer from this that a system that provided a range of educational alternatives would result in better education. Consideration of this complex issue is beyond the scope of this paper. However, it is important to point out that any educational system that provided poor families (as well as other families) with a meaningful range of choices would be a system involving third party payments and a significant amount of regulation. (See Educational Vouchers [1970] for a discussion of alternative models.) Thus, the relevant debate is not about the relative merits of public school monopolies and free market competition. Instead, the relevant debate concerns the properties of alternative regulatory regimes.

10. These grants differ from merit pay in that the competition is voluntary and there is, at least in principle, no limit on the number of teachers in a school or school district who may receive awards. The McDonnell and McLaughlin study (p. 100) indicates that the stimulus to performance provided by the grant program came primarily from the recognition of initiative and was quite independent of the size of the grant.

11. The creation of a hierarchy of teaching positions, with promotions dependent on perceived merit, does introduce a significant performance element into the employment contract. However, such hierarchical job structures, which are common in the private sector, differ from the normal conception of performance-based contracts for teachers in that the compensation and job security of teachers in any given step of the hierarchy are independent of performance assessments.

12. To see how different the management of human resources was before the introduction of collective bargaining, see Gerwin's (1969) description of the procedures used by the city of Pittsburgh in the early 1960's to determine teachers' salaries. Gerwin describes how Pittsburgh "granted" a general salary increase when "no comparable school districts had lower B.A. starting salaries for teachers" (p. 56).

13. See Mitchell et al. (1980) for a discussion of recent changes in relationships between teachers and administrators.

14. For a description of the role of unions in promoting productivity through participation in the management of programs such as early retirement options, see Freeman and Medoff (1979).

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